INTERMEDIATES BETWEEN *EUCALYPTUS POPULNEA* F. MUELL. AND *E. BROWNII* MAID. & CAMBAGE

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SUMMARY

Field observations and herbarium studies indicate that populations intermediate in leaf characters between *Eucalyptus populnea* F. Muell. and *E. brownii* Maid. & Cambage occur over almost two degrees of latitude in central Queensland.

Eucalyptus populnea F. Muell. ("poplar box") and *E. brownii* ("Reid River box") occupy similar ecological situations. Field observations and herbarium studies indicate that populations intermediate in leaf characters between the two occur where their ranges meet in central Queensland. The intermediate nature of the populations was first appreciated during a preliminary survey of the vegetation of the Suttor and Belyando River basins. The area is shown on Figure 1.

Variation within the populations is not markedly large but on the whole, leaves become broader and shorter, and petioles longer as one goes from north to south. The variation encountered within a population is shown in Figure 2 where breadth and length-breadth ratios, converted to a logarithmic scale as suggested for juvenile leaves by Pryor (1957) are plotted. Three leaves from each of 13 trees in a stand of undoubted *E. populnea* near "Mantuan Downs" are considered.

No collection was available for study from the type locality of *E. populnea* (on the Maranoa River about 70 miles SE. by S. of "Mantuan Downs"), but leaves from three extensive collections from Roma, 170 miles SE. by S. of "Mantuan Downs" were studied. The leaves of these collections are about the same size and show about the same range of variation as those from "Mantuan Downs". This suggested that changes in leaf characters are much less abrupt south of "Mantuan Downs" than they are north of it.

Herbarium material at Brisbane confirms that some specimens from central Queensland identified either as *E. populnea* or *E. brownii* are intermediate in leaf characters between these species as defined by Blakely (1955). Measurements of length and breadth of leaf, distance of broadest part of leaf from the base, and length of petiole were made from herbarium collections of L. G. Adams (Adams

Nos. 990, 1177, 1204, 1211, 1213, 1218, 1286, 1307, and 1345, CANB) and additional fragments collected by myself; and ratios of length to breadth, to distance of broadest part from the base, and to petiole length were calculated. Correlations between breadth and the calculated ratios are extremely good. The ratios show a north-south gradient without any discontinuities.

An example of continuous variation is shown in Figure 3 where length-breadth ratios on a logarithmic scale are plotted against breadths. Three leaves from each specimen or fragment collected within $\frac{1}{2}^\circ$ east or west of 147° E. long. are used. The specimens were collected between "Yandaburra" and Mt. Coolon. A leaf from type material of *E. brownii* from Reid River and single leaves of other herbarium specimens from the area are included for comparison. The north-south gradation is illustrated in Figure 4 where the length-breadth ratios are plotted against the latitudinal distance north of "Yandaburra".

The figures suggest that plants intermediate in leaf characters between *E. populnea* and *E. brownii* occur over almost two degrees of latitude in this area and that the gradation between the species is continuous. Statistically rigorous sampling of the populations would be necessary to confirm the trend shown. Measurements of other parts of the plants, for example, fruit length and diameter, pedicel length, size of juvenile leaves, may reveal similar clinal variation, or possibly discontinuities of taxonomic value.

Hybrids between *E. populnea* and *E. drepanophylla* F. Muell. and *E. populnea* and *E. crebra* F. Muell. ex Benth. having leaves narrower than "typical" *E. populnea* also occur and, in the herbarium, may be confused with the reported intermediates. Hybrid trees usually occur singly, have slightly furrowed bark, and lack the characteristically shiny leaves of *E. populnea* and *E. brownii.*

Difficulties in the classification of clines have long been recognized and are discussed by Davis and Heywood (1963). The recognition of cline forms proposed by Pryor (1956) for *E. pauciflora* Sieb. ex Spreng. is not possible in the present case as there are no well marked variants confined to particular habitats.

Field observations suggest that the cline described represents a regionally steep gradiant that is moderate or level within the ranges of *E. brownii* and *E. populnea. E. brownii* might therefore be regarded as a subspecies of *E. populnea,* but the problem of determining the intermediates would remain. Until the systematics of *Eucalyptus* as a whole are reviewed then the recognition of subspecies is likely to lead to an unwieldly and inconsistent system of nomenclature.

In the account of the vegetation of the Nogoa-Belyando area (Gunn *et al.,* 1967) I have treated *E. brownii* as having leaves more than 8·5 cm long, usually less than 2·5 cm broad, and more than $3\frac{1}{2}$ times as long as broad. These arbitrary measurements are shown on Figures 3 and 4. Though still not sharply demarcated from *E. populnea, E. brownii* is then restricted to the north-west of a line running through Barcaldine and Mt. Coolon to the coast near Bowen.

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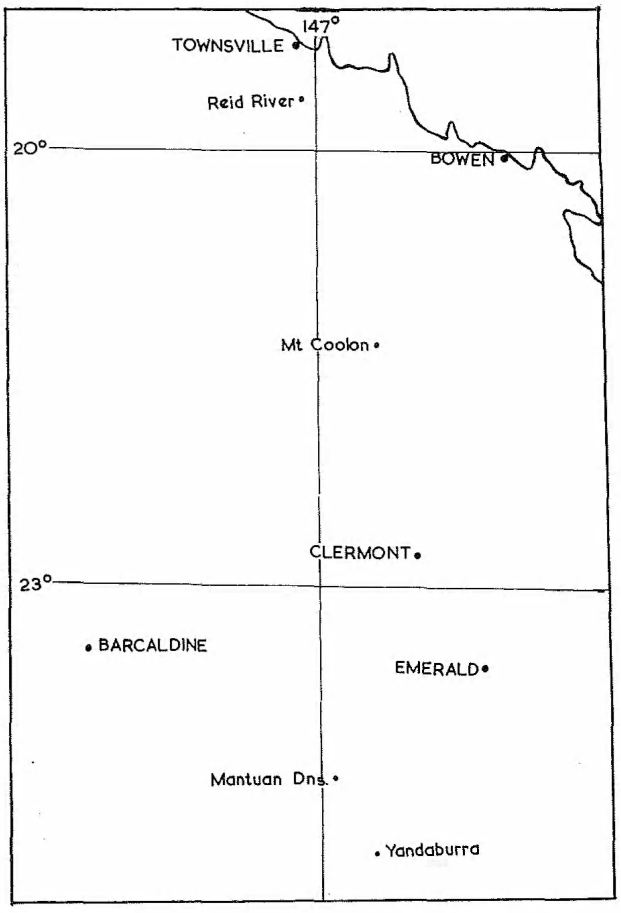

FIG. 1. Map with localities mentioned in text.

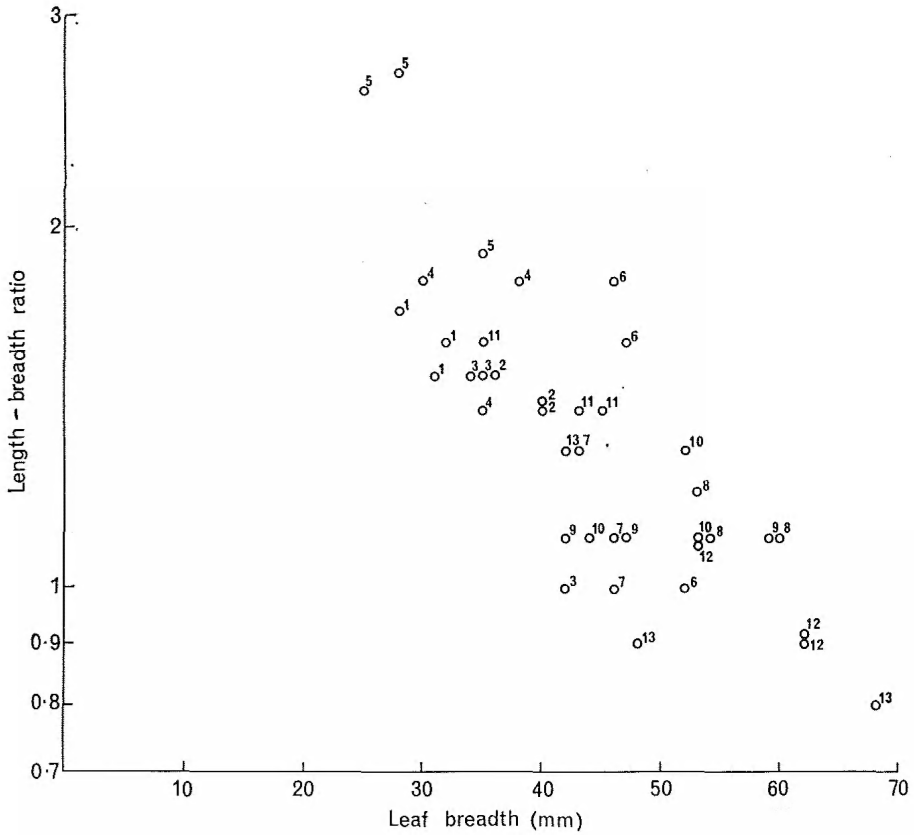

FIG. 2. Variation within one population of *E. populnea*, "Mantuan Downs". Three leaves from each of 13 trees. The trees are numbered 1–13.

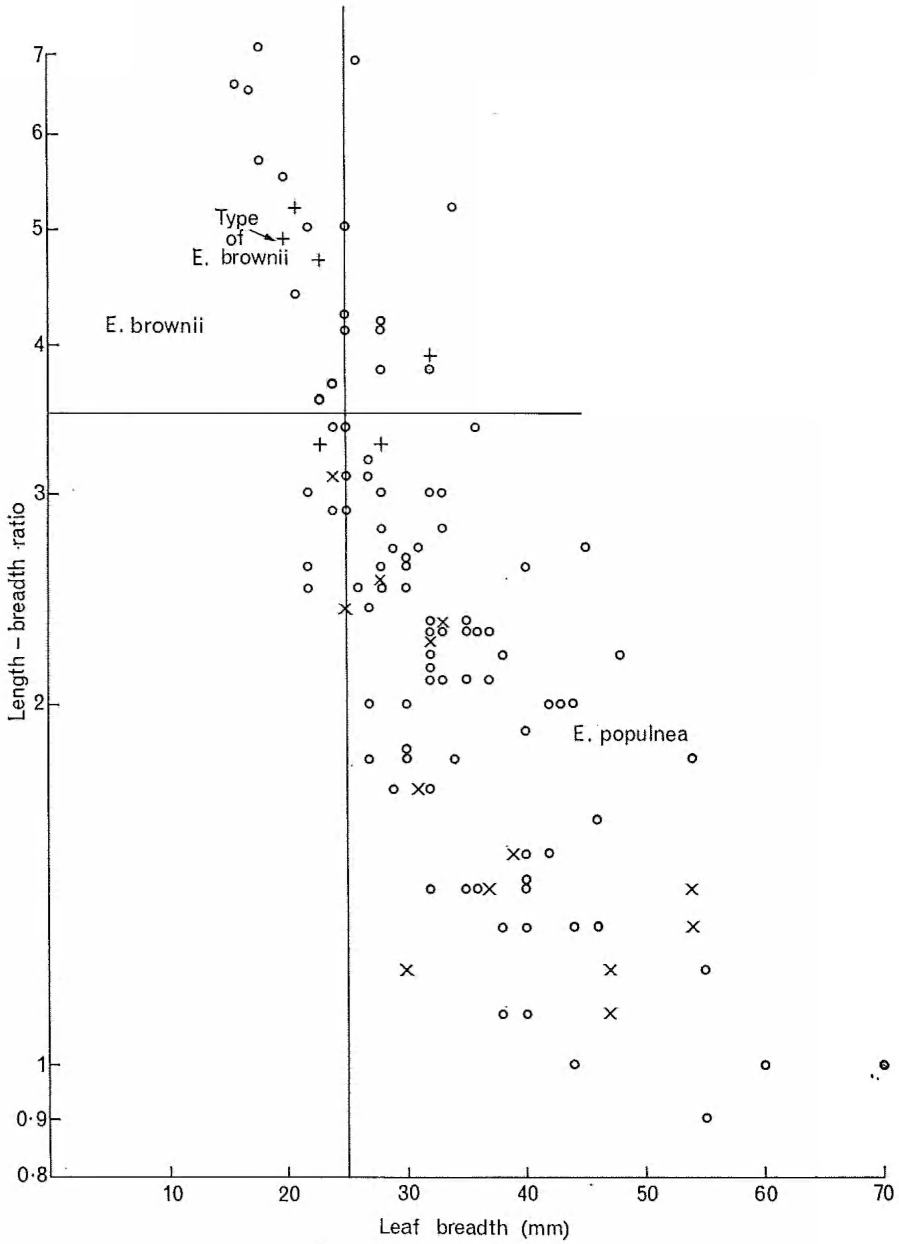

FIG. 3. Continuous variation between *E. populnea* and *E. brownii*.
o = Specimens collected by Adams and by Pedley (3 leaves from each).
x = Specimens (BRI) identified as *E. populnea* (1 leaf from each).
+ = Specimens (BRI) identified as *E. brownii* (1 leaf from each).

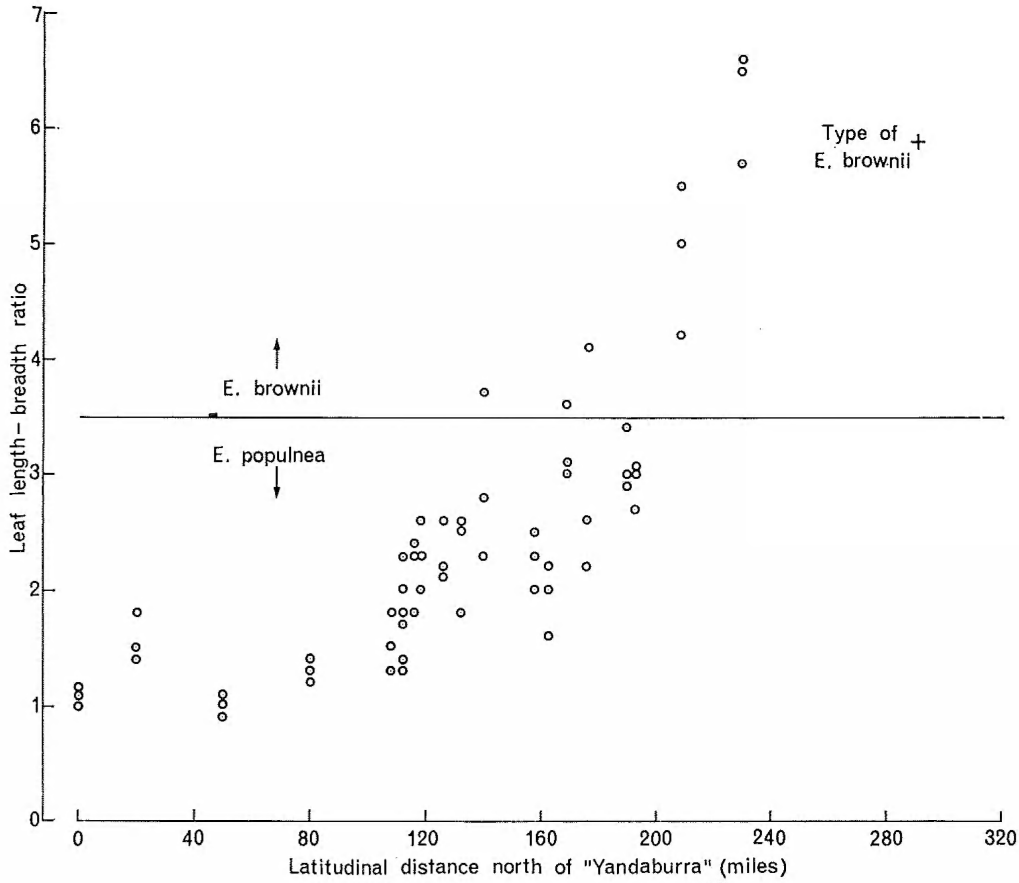

FIG. 4. Trend of length/breadth values with latitudinal distance north of "Yandaburra". Symbols as for Fig. 3.

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